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BRIEF REPORT

Posttraumatic Stress Symptoms in Police Staff 12–18 Months After the Canterbury Earthquakes

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Understanding posttraumatic stress disorder (PTSD) symptoms in police first-responders is an underdeveloped field. Using a cross-sectional survey, this study investigated demographic and occupational characteristics, coping resources and processes, along with first-responder roles and consequences 18 months following a disaster. Hierarchical linear regression ($N = 576$) showed that greater symptom levels were significantly positively associated with negative emotional coping ($\beta = .31$), a communications role ($\beta = .08$) and distress following exposure to resource losses ($\beta = .14$), grotesque scenes ($\beta = .21$), personal harm ($\beta = .14$), and concern for significant others ($\beta = .17$). Optimism alone was negatively associated ($\beta = -15$), with the overall model being a modest fit (adjusted $R^2 = .39$). The findings highlight variables for further study in police.

Posttraumatic stress disorder (PTSD) symptoms in police have been considered in both routine policing (Maguen et al., 2009) and disaster roles (Pietrzak et al., 2012). Point prevalence rates for PTSD in police may be relatively lower than other first responder workforces (Berger et al., 2011; Kleim & Westphal, 2011), and there is no single rescue personality (Salters-Pedneault, Ruef, & Orr, 2010, p. 214). Accordingly, there is a need to distingush first-responder occupational groups from each other and studying individual groups.

Vulnerability to PTSD symptoms includes considering pre-, peri- (during the traumatic event), and post- (weeks and months that follow) trauma issues. Demographic variables are not equally valid across traumatised groups. For example, female gender and minority ethnic status are associated with PTSD in some studies, but not others (Brewin, Andrews, & Valentine, 2000), and may be culturally and economically determined, thereby making hypotheses regarding these difficult when applied to the extremely rare event in New Zealand. We speculate though that police with less "routine" emergency role experience may be more vulnerable (Hagh-Shenas, Goodarzi, Dehbozorgi, & Farashbandi, 2005; Kleim & Westphal, 2011).

People also have coherent trait-like "coping signatures" (Ptacek, Smith, Raffety, & Lindgren, 2008, p. 168) to call upon in a trauma. Studies rarely differentiate between coping processes ("thoughts and behaviours undertaken to manage the demands of stressful events" (Taylor & Stanton, 2007, p. 379) such as emotion and problem-focused coping ~~(Carver, 2010)~~ and coping resources ("the specific intrapsychic or Q2 behavioral actions that people use for managing stress" (Taylor & Stanton, 2007, p. 382), including constructs such as optimism/pessimism. Resources influence the choice and effectiveness of coping processes and have psychological health effects in their own right, meaning that processes and resources are relevant in understanding postdisaster well-being. Other important peri- and postdisaster factors include exposure-related distress (Chan et al., 2011) and first-responder roles (e.g., search and rescue workers; Pietrzak et al., 2012), though often multiple roles are assigned.

A recent New Zealand disaster provided an opportunity to investigate risk factors for PTSD symptoms in sworn (staff sworn to an oath) and nonsworn (civilian auxiliary staff) police. Preceded by a magnitude 7.1 earthquake 5 months earlier, on February 22, 2011 a devastating earthquake Q3 hit the Canterbury region (population approximately 520,000) resulting in widespread fatalities and destruction, especially in the region's central business district. Further infrastructure damage occurred with significant aftershocks (magnitude ≥ 5) 4 and 10 months later.

Focusing on factors easily assessed by human resources staff, we investigated the association between pre- (demographic

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characteristics, normal work characteristics, normal coping resources, and processes), peri- (first-responder roles and responses, exposure frequency), and post- (exposure distress) earthquake factors and PTSD symptom levels 12–18 months after the disaster. We hypothesised that greater symptom levels would be associated with the following: not having prior specialist emergency roles, being a civilian, and greater reliance on negative emotion-based dysfunctional coping and/or pessimism before the quake; working in more earthquake events, a worksite closer to the disaster zone, and working in emotionally provocative roles (e.g., search & rescue/victim recovery) in the immediate aftermath; and greater distress following exposure to work-based and personal repercussions in the 12–18 months that followed.

Method

Participants and Procedure

All police residing in the region on February 22, 2011 were considered eligible, excluding those in sensitive or undercover roles. Due to worksite displacement, Internet-based data collection was used, with study information placed in internal communications, followed by e-mail prompts and leaflet drops. For security reasons, the survey link (Survey Monkey®, www.surveymonkey.com) was sent via the police network, though identifying the study as independent. Ethical approval was obtained from the University of Otago Ethics Committee and the New Zealand Police.

Of the 1048 eligible participants, 768 (73.3%) responses were received. After eliminating from the 768 returns cases where >50% of the psychological questionnaire items were incomplete, the sample came to $N = 687$ (65.5%). Noncompleters and completers were not significantly different on any demographic or work variables.

After demographic questions, participants reported their usual work location, whether they normally held an additional specialist emergency role (e.g., search and rescue), which first-responder roles they took part in (police-ascertained list) in response to the February 22, 2011 index event, and how many of the three other earthquake aftershock events they worked.

Measures

The Brief COPE (Carver, 1997) is a 28-item Likert-like scale (1 = *I usually don't do this at all*, 4 = *I usually do this a lot*) measuring coping strategies. Reflecting three clusters (Carver, Scheier, & Weintraub, 1989) three subscales were used: emotion-focused coping (10 items; e.g., I try to see it in a different light); problem-focused coping (6 items; e.g., I get help and advice from other people); and dysfunctional (denial, disengagement, and venting) coping (12 items; e.g., I give up the attempt to cope; Cooper, Katona, & Livingston, 2008). Internal consistency across the dimension scores varied ($\alpha = .69$ to .80) in the sample.

The Life-Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994), is a 10-item (0 = *strongly disagree*; 4 = *strongly agree*) single scale inventory measuring optimism, with high internal consistency ($\alpha = .82$).

The Traumatic Exposure Severity Scale (TESS; Elal & Slade, 2005) is a 24-item inventory assessing types of earthquake exposure (yes/no), and if yes, levels of distress (1= *not at all*; 5 = e*xtremely*). It yields Total Occurrence and Distress scales and respective subscales (Resource Loss/Being in Need; Damage to Home and Goods; Personal Harm; Concern for Significant Others; Exposure to Grotesque). As the Total Occurrence and Distress scales were highly correlated ($r = .90$) in this sample, only the Distress subscales were used, with variable internal consistency (Concern for Significant Others: $\alpha = .47$ to Exposure to Grotesque: $\alpha = .77$).

PTSD symptom level was assessed using the 22-item Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1996; 0 = *not at all*; 4 = *extremely*), with high total score internal consistency ($\alpha = .95$). Participants were instructed to refer to the index event (February 22, 2011).

Data Analysis

Where < 20% of items were missing on psychometric measures (LOT-R: $n = 8$; TESS Resource Loss Distress: $n = 13$; TESS Personal Harm Distress: $n = 36$; TESS Concern for Others Distress: $n = 15$; IES-R: $n = 36$), missing values were replaced with the arithmetic mean of the available items to compute the total scale score. Data were analysed using SPSS (Version 22) with automatic deletion of cases with any missing values, meaning that the maximum sample size varied (univariate analysis: $N = 611$; multivariate analysis: $N = 576$; 83.8%).

Univariate analyses (χ^2, t tests, analyses of variance) assessed the relationship between the dependent variable (IES-R Total) and independent variables (pre-: demographic and work features, Brief COPE and LOT-R; peri-: first-responder roles, number of earthquake events worked; post-: TESS Distress subscales). Independent variables in the univariate analysis with $p < .10$ were entered into three separate stepwise regression analyses defined individually, according to their likely chronological order as follows: pre- (block one); peri- (block two); post- (block three). The remaining significant variables ($p < .05$) from each regression analysis were entered into a hierarchical linear regression in three blocks to produce a final model.

Results

Sample demographic and psychometric characteristics alongside univariate associations are reported in Table 1. Consistent with this police workforce overall (New Zealand Human Rights Commission, 2012) most were male, of New Zealand European ethnicity, and working in sworn roles. Just over half described their normal work base as within the central business district and one-in-five described holding a specialist role (e.g., Search

Table 1
Descriptive Variables and Univariate Association with IES-R Total

Variable	*M* or *n*	*SD* or %	*F* or *t*	*r*
Age[a]	45.80	8.15		.06
Gender[b]			−0.93	
Male	426	70.0		
Female	183	30.0		
Education level			0.77	
None	19	3.1		
High school	315	51.6		
Tertiary	277	45.3		
Ethnicity			5.4**	
European	541	88.5		
Māori	28	4.6		
All others	42	6.9		
Sworn status			−3.11*	
Sworn	484	79.2		
Nonsworn	127	20.8		
Work location[c]			2.84	
CBD	332	55.8		
Suburban	162	27.2		
Rural or other	595	17.0		
Pre-existing specialist response role	117	27.7		.86
Emotion-based coping[d]	24.02	4.53		.06
Problem-based coping[e]	17.63	3.53		−.07
Dysfunctional coping[f]	19.75	4.42		.45**
Optimism[b]	14.81	4.75		−.31**
Number of EQ events worked	2.59	1.2	0.12**	
Public cordon/containment	261	42.7	−0.93	
Search and rescue	161	26.3	2.52*	
Victim recovery	127	20.8	1.80	
Victim identification	98	16.0	0.35	
Family liaison	72	11.8	1.60	
Media contact role	23	3.8	1.55*	
Dispatch communications	70	11.5	2.14*	
Logistics support	156	25.5	1.93	
Missing persons	30	5.3	0.10	
TESS Distress Scale				
Resource loss/being in need		2.92	4.16	.31**
Damage to home and goods[e]	599	4.44	3.31	.31**
Personal harm[g]	605	.33	1.37	.23**
Concern for significant others[h]	608	4.14	3.06	.35**
Exposure to the grotesque[i]	602	3.95	4.45	.31**

Note. $N = 611$ unless otherwise noted. EQ = earthquake; IES-R = Impact of Event Scale-Revised; CBD = central business district; TESS = Trauma Exposure Severity Scale.
[a]$n = 585$. [b]$n = 609$. [c]$n = 595$. [d]$n = 597$. [e]$n = 599$. [f]$n = 598$. [g]$n = 605$. [h]$n = 608$. [i]$n = 602$.
*$p < .05$. **$p < .01$. ***$p < .001$.

and Rescue, Armed Offenders Squad) in addition to normal duties. As part of the police response to February 22, 2011, most described several first-responder roles as the acute phases of the disaster unfolded. Participants reported low symptom levels on average (IES-R M = 14.3, $SD = 15.0$, $N = 611$, with $n = 90$ with IES-R score = 0), and skewed in that direction as is typical in nonclinical samples.

On univariate analysis, those of Māori ethnicity reported significantly greater PTSD symptoms than those of European and other non-European ethnicity. Greater PTSD symptomatology

Table 2
Hierarchical Linear Regression Showing Associations With IES-R Scores

Variable	Adjusted R^2	ΔR^2	β Step 1	β Step 2	β Step 3	β Final Model
Step 1		.19				
Dysfunctional coping			.44**	.38**	.38**	.31***
Step 2						
Optimism				−.21**	−.20**	−.15***
Step 3	.24					
Total EQ sequences worked					.11**	.03
Dispatch communications role					.07	.08*
Final model	.38					
Distress from resource loss						.14***
Distress from personal harm						.14***
Distress about significant others						.17***
Distress from exposure to grotesque						.21***

Note. $n = 567$. IES-R = Impact of Event Scale-Revised.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

was also associated with being a nonsworn staff member, heavier reliance on dysfunctional coping, working in more earthquake events, and working on first-responder roles of search and rescue, media contact, and dispatch communications. Post-disaster, greater PTSD symptomatology was associated with greater distress in regard to disaster-related resource loss, damage to home and goods, personal harm, concern for significant others, and exposure to grotesque scenes. The resource of optimism was the only variable negatively associated with PTSD symptom level.

In the regression analysis, the effect size for each model was as follows: Step 1 $R^2_{adj} = .19$; Step 2 $R^2_{adj} = .23$; Step 3 $R^2_{adj} = .24$; Final Model $R^2_{adj} = .38$. The final model (Table 2) showed the independent contribution of seven variables: dysfunctional coping, a dispatch communications role, and high distress following exposure to resource losses, grotesque scenes, personal harm, and concern for significant others. Again, the coping resource of optimism was the sole variable associated with a lower PTSD symptom level.

Discussion

Reliance on denial, disengagement, and venting were unhelpful coping styles to take into a disaster of this type potentially because of their ineffectiveness when needing to manage prolonged aftermaths. Although possibly not harmful in the short term, earthquake effects are not short-lived and dysfunctional coping styles may interfere with progressive adaptation. Optimism appeared helpful as a background resource. Possibly when faced with threats, the adaptive outlook induced by high optimism may be sufficiently sustainable to allow efficient navigation through and out the other side of adverse experiences. However, whether this is truly protective needs to be examined in prospective studies. The findings regarding the significance of the multiple forms of exposure and consequences concur with other earthquake studies (Chan et al., 2011; Zhou et al., 2013): Reactions to material and emotional losses and consequences in the early stages of the disaster are important in understanding later traumatic responses.

In this study, being a sworn staff member or having a prior specialist role appeared to be irrelevant workforce factors despite hypothesized as being associated with lower PTS symptom levels. Likewise, closer work proximity to the disaster zone was not significant, though this may have been because the disaster zone was geographically widespread. The significance of dispatch communications first-responder roles was important. Such roles expose staff to all aspects of a disaster including handling pleading calls for help and hearing graphic details of the disaster, yet at the same time having no control to directly help victims. Elevated PTSD symptoms have been reported in other dispatch communications staff (Pierce & Lilly, 2012), supporting further research on this specific workforce.

The study had limitations including the use of cross-sectional data and questionnaires, though the sheer scale of this disaster rendered clinical interviews impractical. Further, coping may not have reflected pretrauma coping despite using measures emphasising this, and the number of participants in some first-responder roles was small. Finally, management of missing data and method for including variables in the multivariate models was suboptimal, though reasonable given the context of a relatively high response rate in an understudied group. Knowledge about prevention/intervention strategies for first responders is underdeveloped (Kleim & Westphal, 2011). As the largest study of New Zealand police, the findings highlight variables and possible vulnerable subgroups for future research. In time, such work may have implications for managing more routine work-related trauma exposure.

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Queries

Q1: **Author: Please confirm that given names (red) and surnames/family names (green) have been identified correctly.**
Q2: **Author: What was its magnitude**
Q3: **Author: There is only a Carver, 1997 ref in the Reference List. Please correct year here or include this reference in the Reference List**